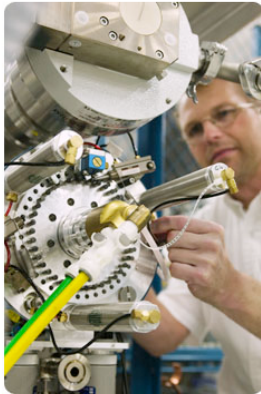


## LIVERMORE LAB REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Oct. 8-12, 2012



COLD CASES HEAT UP



### **Bruce Buchholz loads a sample in the accelerator.**

In an effort to identify the thousands of John/Jane Doe cold cases in the United States, Lawrence Livermore researcher and a team of international collaborators have found a multidisciplinary approach to identifying the remains of missing persons.

Using "bomb pulse" radiocarbon analysis developed at Lawrence Livermore, combined with recently developed anthropological analysis and forensic DNA techniques, the researchers were able to identify the remains of a missing child 41 years after the discovery of the body.

The multidisciplinary analyses resulted in a legal identification 41 years after the discovery of the remains, highlighting the enormous potential of combining radiocarbon analysis with anthropological and mitochondrial DNA analyses in producing confident personal identifications in forensic cold cases dating to within the last 60 years.

"There are thousands of John Doe and Jane Doe cold cases in the United States," said Livermore scientist Bruce Buchholz, who conducted the radiocarbon analysis in the case. "I believe we could provide birth dates and death dates for many of these cases."

To read more, go to [Newsday](#).

## physicstoday SHIFTING THE EMPHASIS



### **The National Ignition Facility**

Though the National Ignition Campaign officially ended Sept. 30, the facility is well on its way to ignition and has hit many milestones along the way.

The three-football-field-sized NIF has performed well since 2009, with the 192-beam laser exceeding its design level of 1.8 megajoules of energy and 500 terawatts of power. The quality of the target capsules and the cryogenic fuel pellets exceeded expectations, and the experiments have produced an outstanding set of experimental data thanks to NIF's large suite of diagnostics. Although the campaign produced a two order of magnitude, progress toward ignition, researchers remained one order of magnitude away from their goal at campaign's end.

With the start of the new fiscal year on Oct. 1, much more of NIF's time is being turned over to other experiments in support of ensuring the reliability of the nuclear weapons stockpile. To read more, go to [Physics Today](#).

## Popular Mechanics BREAK ON THROUGH



### **Bruce Goodwin and Michel McCoy in front of Sequoia.**

Sequoia, the world's fastest supercomputer housed at Lawrence Livermore, is about to start mimicking the human heart.

The 20-petaflop computer is about to begin a new project, according to the Lab's principal associate director for Weapons and Complex Integration Bruce Goodwin. Sequoia recently earned a Breakthrough Award from *Popular Mechanics* magazine.

In addition to simulating nuclear weapon scenarios, the fastest computer in the world will soon start modeling the complex electrical signals that drive the human heart.

This kind of computer-based replication will allow researchers to see how the heart could respond to certain medical treatments and even drugs, Goodwin says. While drug testing could take years to complete, accurate modeling of the system could mean less time spent looking into ultimately ineffectual treatments.

To read more, go to [Popular Mechanics](#).

## Los Angeles Times IT'S HOT, HOT, HOT



## **Drought could reduce the U.S. corn harvest by 12 percent.**

It was a long hot summer. The United States experienced the warmest July in its history, with more than 3,000 heat records broken across the country. Overall, the summer was the nation's third warmest on record and comes in a year that is turning out to be the hottest ever. High temperatures along with low precipitation generated drought conditions across 60 percent of the lower 48 states. Arctic Sea ice declined to a record low, and a surface thaw swept across 97 percent of the Greenland ice cap.

The increasingly powerful evidence of a longterm warming trend is making climatechange denial more difficult to defend. Climate skeptics are changing their minds.

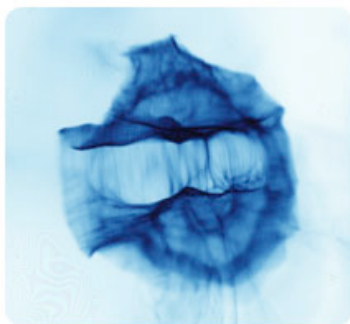
A team headed by the Laboratory's Peter Gleckler this summer provided strong evidence that the recent warming of the ocean surface could be traced to human activities.

The evidence is now overwhelming that the warming the earth is experiencing has a manmade cause.

To read more, go to [The Los Angeles Times](#).



**OUT OF THE CHAOS**



## **Plasmas stream from the top and bottom to form large-scale electromagnetic fields.**

Lab researchers' discovery of self-organized electromagnetic fields in counter-streaming ionized gases is paving the way for scientists to have new ways to explore how order can emerge from chaos in the universe.

"We've created a model for exploring how electromagnetic fields help organize ionized gas or plasma in astrophysical settings, such as in the plasma flows that emerge from young stars," said lead author Nathan Kugland, a postdoctoral researcher in the High Energy Density Science Group at LLNL.

He said these fields helped to shape the flows, and could play a supporting role alongside gravity in the formation of solar systems. This means it also could have eventually led to the creation of planets like Earth.

Hye-Sook Park, team leader and staff physicist at LLNL, said the observations were completely unexpected, because plasmas move so quickly they should freely stream past each other.

To read more, go to [Red Orbit](#).

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LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

To send input to the *Livermore Lab Report*, send [e-mail](#).